

Rörflänsar – Flänsförband – Skruvförband –
Del 2: Klassificering av material för flänsar, skruvar
och muttrar för PN-betecknade stålflänsar

Flanges and their joints – Bolting –
Part 2: Classification of bolt materials for steel
flanges, PN designated

Europastandarden EN 1515-2:2001 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 1515-2:2001.

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Flanges and their joints - Bolting - Part 2: Classification of bolt materials for steel flanges, PN designated

Brides et leurs assemblages - Boulonnerie - Partie 2:
Classification de matériaux de boulonnerie pour brides en
acier, désignées PN

Flansche und ihre Verbindungen - Schrauben und Muttern -
Teil 2: Klassifizierung von Schraubenwerkstoffen für
Stahlflansche, nach PN bezeichnet

This European Standard was approved by CEN on 20 October 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 74 "Flanges and their joints", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2002, and conflicting national standards shall be withdrawn at the latest by June 2002.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

EN 1515 consists of two Parts:

Part 1: Selection of bolting;

Part 2: Classification of bolt materials for steel flanges, PN designated.

The annexes A and ZA are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard covers the classification of bolt materials combination with the flange material groups of steel flanges prEN 1092-1 (PN-designated).

Bolt materials are listed in EN 1515-1, flange material groups are listed in prEN 1092-1.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard, only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

prEN 1092-1, *Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges*.

EN 1515-1, *Flanges and their joints - Bolting - Part 1: Selection of bolting.*

EN 10269, *Steels and nickel alloys for fasteners for use at elevated and/or low temperature properties.*

EN ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs (ISO 898-1:1999).*

EN ISO 3506-1, *Mechanical properties of corrosion-resistant stainless steel fasteners – Part 1: Bolts, screws and studs (ISO 3506-1:1997).*

3 Combination of materials

Bolt materials can be combined with flange material groups as given in Table 1. This table is valid for all flanges for which pressure temperature (p/T) ratings are given in prEN 1092-1. For flanges which have no p/T ratings (e.g. DN 700 and above), the tables may be used as a guide.

All bolt materials can be used in the range of the p/T ratings given for the flanges. Restrictions due to the classification shall be observed (see clause 4).

WARNING Bolt materials 4.6 and 6.8 are not intended for the use in the scope of the Pressure Equipment Directive.

4 Classification of bolt materials

The classification of bolt materials as given in Table 1 is based on the comparison of the strengths of the flange material and the bolt material. The strength ratio r of the flange/bolt combination chosen is compared with the strength ratio of the flange bolt combination used for the standard flange calculation (see annex A).

For each flange material group the classification is done in three strength levels:

- **Low strength:** The strength ratio of the chosen flange/bolt combination is less than that used in the standard flange calculation.
These bolts may be used for less severe service, e.g. for water service or in case of oversized flanged joints. For definition of these service conditions, special experience is necessary otherwise a recalculation of the flanged joint shall be done.
- **Normal strength:** The strength ratio of the chosen flange/bolt combination is similar (within defined limits) to that used in the standard flange calculation.
These bolts may be used for all service in the range of the P/T-ratings unless there are other restrictions to the contrary.
- **High strength:** The strength ratio of the chosen flange/bolt combination is much more higher than that used in the standard flange calculation.
These bolts may be used in the same range like normal strength level bolting. During assembly however, care should be taken not to overstress the flanges (e. g. by means of torque control).

Table 1 – Classification of bolt materials

Flange materials prEN 1092-1		Bolt materials EN 1515-1				Classification
Group	Type	Material/property class	Standard	Dia.	Line No.	Strength
1E0	CS	4.6	EN ISO 898-1	All	01	Low
		A4-50, A2-50	EN ISO 3506-1	<=39	16, 18	
		X5CrNiMo17-12-2 AT	EN 10269	<=160	20	
		X5CrNi18-10	EN 10269	<=160	22	
		5.6	EN ISO 898-1	All	02	Normal
		6.8	EN ISO 898-1	All	03	
		25CrMo4	EN 10269	<=100	05, 07	
		21CrMoV5-7	EN 10269	<=160	12	
		X7CrNiMoBNb16-16	EN 10269	<=160	15	
		A4-70, A2-70	EN ISO 3506-1	<=24	17, 19	
		X5CrNiMo17-12-2 AT+C	EN 10269	<=160	21	
		X5CrNi18-10 AT+C	EN 10269	<=160	23	
		8.8	EN ISO 898-1	All	04	High
		42CrMo4	EN 10269	<=60	06, 08	
		30CrNiMo8	EN 10269	<=100	09	
		42CrMo5-6	EN 10269	<=100	10	
		40CrMoV4-6	EN 10269	<=100	11	
		20CrMoVTiB4-10	EN 10269	<=160	13	
X6NiCrTiMoVB 25-15-2	EN 10269	<=160	14			
3E0	CS high temp.	4.6	EN ISO 898-1	All	01	Low
		A4-50, A2-50	EN ISO 3506-1	<=39	16, 18	
		X5CrNiMo17-12-2 AT	EN 10269	<=160	20	
		X5CrNi18-10	EN 10269	<=160	22	
		5.6	EN ISO 898-1	All	02	Normal
		6.8	EN ISO 898-1	All	03	
		25CrMo4	EN 10269	<=100	05, 07	
		21CrMoV5-7	EN 10269	<=160	12	
		X6NiCrTiMoVB 25-15-2	EN 10269	<=160	14	
		X7CrNiMoBNb16-16	EN 10269	<=160	15	
		A4-70, A2-70	EN ISO 3506-1	<=24	17, 19	
		X5CrNiMo17-12-2 AT+C	EN 10269	<=160	21	
		X5CrNi18-10 AT+C	EN 10269	<=160	23	
		8.8	EN ISO 898-1	All	04	High
		42CrMo4	EN 10269	<=60	06, 08	
		30CrNiMo8	EN 10269	<=100	09	
		42CrMo5-6	EN 10269	<=100	10	
		40CrMoV4-6	EN 10269	<=100	11	
20CrMoVTiB4-10	EN 10269	<=160	13			

continued

Table 1 (continued)

Flange materials prEN 1092-1		Bolt materials EN 1515-1				Classification
Group	Type	Material/property class	Standard	Dia.	Line No.	Strength
3E1	CS high temp.	4.6	EN ISO 898-1	All	01	Low
		5.6	EN ISO 898-1	All	02	
		A4-50,A2-50	EN ISO 3506-1	<=39	16, 18	
		X5CrNiMo17-12-2 AT	EN 10269	<=160	20	
		X5CrNi18-10	EN 10269	<=160	22	
		6.8	EN ISO 898-1	All	03	Normal
		8.8	EN ISO 898-1	All	04	
		25CrMo4	EN 10269	<=100	05, 07	
		21CrMoV5-7	EN 10269	<=160	12	
		20CrMoVTiB4-10	EN 10269	<=160	13	
		X6NiCrTiMoVB 25-15-2	EN 10269	<=160	14	
		X7CrNiMoBNb16-16	EN 10269	<=160	15	
		A4-70, A2-70	EN ISO 3506-1	<=24	17, 19	
		X5CrNiMo17-12-2 AT+C	EN 10269	<=160	21	
		X5CrNi18-10 AT+C	EN 10269	<=160	23	
		42CrMo4	EN 10269	<=60	06, 08	High
		30CrNiMo8	EN 10269	<=100	09	
		42CrMo5-6	EN 10269	<=100	10	
		40CrMoV4-6	EN 10269	<=100	11	
4E0	0,5 Mo	4.6	EN ISO 898-1	All	01	Low
		5.6	EN ISO 898-1	All	02	
		A4-50,A2-50	EN ISO 3506-1	<=39	16, 18	
		X5CrNiMo17-12-2 AT	EN 10269	<=160	20	
		X5CrNi18-10	EN 10269	<=160	22	
		6.8	EN ISO 898-1	All	03	Normal
		8.8	EN ISO 898-1	All	04	
		25CrMo4	EN 10269	<=100	05, 07	
		21CrMoV5-7	EN 10269	<=160	12	
		X6NiCrTiMoVB 25-15-2	EN 10269	<=160	14	
		X7CrNiMoBNb16-16	EN 10269	<=160	15	
		A4-70, A2-70	EN ISO 3506-1	<=24	17, 19	
		X5CrNiMo17-12-2 AT+C	EN 10269	<=160	21	
		X5CrNi18-10 AT+C	EN 10269	<=160	23	
		42CrMo4	EN 10269	<=60	06, 08	
		30CrNiMo8	EN 10269	<=100	09	
		42CrMo5-6	EN 10269	<=100	10	
		40CrMoV4-6	EN 10269	<=100	11	
		20CrMoVTiB4-10	EN 10269	<=160	13	

continued

Table 1 (continued)

Flange materials prEN 1092-1		Bolt materials EN 1515-1				Classification
Group	Type	Material/property class	Standard	Dia.	Line No.	Strength
5E0	1Cr-0,5Mo	4.6	EN ISO 898-1	All	01	Low
		5.6	EN ISO 898-1	All	02	
		A4-50,A2-50	EN ISO 3506-1	<=39	16, 18	
		X5CrNiMo17-12-2 AT	EN 10269	<=160	20	
		X5CrNi18-10	EN 10269	<=160	22	
		6.8	EN ISO 898-1	All	03	Normal
		8.8	EN ISO 898-1	All	04	
		25CrMo4	EN 10269	<=100	05, 07	
		42CrMo4	EN 10269	<=60	06, 08	
		42CrMo5-6	EN 10269	<=100	10	
		40CrMoV4-6	EN 10269	<=100	11	
		21CrMoV5-7	EN 10269	<=160	12	
		20CrMoVTiB4-10	EN 10269	<=160	13	
		X6NiCrTiMoVB 25-15-2	EN 10269	<=160	14	
		X7CrNiMoBNb16-16	EN 10269	<=160	15	
		A4-70, A2-70	EN ISO 3506-1	<=24	17, 19	
		X5CrNiMo17-12-2 AT+C	EN 10269	<=160	21	
		X5CrNi18-10 AT+C	EN 10269	<=160	23	
		30CrNiMo8	EN 10269	<=100	09	
6E0	2Cr-1Mo	4.6	EN ISO 898-1	All	01	Low
		5.6	EN ISO 898-1	All	02	
		A4-50,A2-50	EN ISO 3506-1	<=39	16, 18	
		X5CrNiMo17-12-2 AT	EN 10269	<=160	20	
		X5CrNi18-10	EN 10269	<=160	22	
		6.8	EN ISO 898-1	All	03	Normal
		8.8	EN ISO 898-1	All	04	
		25CrMo4	EN 10269	<=100	05, 07	
		42CrMo4	EN 10269	<=60	06, 08	
		42CrMo5-6	EN 10269	<=100	10	
		40CrMoV4-6	EN 10269	<=100	11	
		21CrMoV5-7	EN 10269	<=160	12	
		20CrMoVTiB4-10	EN 10269	<=160	13	
		X6NiCrTiMoVB 25-15-2	EN 10269	<=160	14	
		X7CrNiMoBNb16-16	EN 10269	<=160	15	
		A4-70, A2-70	EN ISO 3506-1	<=24	17, 19	
		X5CrNiMo17-12-2 AT+C	EN 10269	<=160	21	
		X5CrNi18-10 AT+C	EN 10269	<=160	23	
		30CrNiMo8	EN 10269	<=100	09	

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